Exhibit 24

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF WEST VIRGINIA
CHARLESTON DIVISION

B.P.J. by her next friend and mother, HEATHER JACKSON, *Plaintiff*, v. WEST VIRGINIA STATE BOARD OF EDUCATION, HARRISON COUNTY BOARD OF EDUCATION, WEST VIRGINIA SECONDARY SCHOOL ACTIVITIES COMMISSION, W. CLAYTON BURCH in his official capacity as State Superintendent, DORA STUTLER in her official capacity as Harrison County Superintendent, and THE STATE OF WEST VIRGINIA, *Defendants*, and LAINEY ARMISTEAD, *Defendant-Intervenor*.	Civil Action No. 2:21-cv-00316 Hon. Joseph R. Goodwin

EXPERT REPORT AND DECLARATION OF
JOSHUA D. SAFER, MD, FACP, FACE

1. I have been retained by counsel for Plaintiffs as an expert in connection with the above-captioned litigation.

2. The purpose of this expert report and declaration is to offer my expert opinion on: (1) relevant medical and scientific background regarding gender identity and the attempted regulation of transgender women playing women's sports, including the Endocrine Society's Guidelines for providing gender-affirming care to transgender people; (2) the policies of athletic organizations regarding the participation of transgender women in women's sports, the difficulties that have arisen when athletic associations have attempted to define a person's sex,

and the relationship of these policies to the scholastic context; and (3) whether there is any medical justification for West Virginia's exclusion of transgender women and girls from school sports, including whether the available scientific evidence supports West Virginia's assertion that "classification of athletic teams according to" an "individual's reproductive biology and genetics at birth sex" "is necessary to promote equal athletic opportunities for the female sex."

3. I have knowledge of the matters stated in this expert report and declaration and have collected and cite to relevant literature concerning the issues that arise in this litigation in the body of this declaration and in the attached bibliography.

4. In preparing this expert report and declaration, I relied on my scientific education and training, my research experience, and my knowledge of the scientific literature in the pertinent fields. The materials I have relied upon in preparing this declaration are the same types of materials that experts in my field of study regularly rely upon when forming opinions on the subject. I may wish to supplement these opinions or the bases for them as a result of new scientific research or publications or in response to statements and issues that may arise in my area of expertise.

PROFESSIONAL BACKGROUND

5. I am a Staff Physician in the Endocrinology Division of the Department of Medicine at the Mount Sinai Hospital and Mount Sinai Beth Israel Medical Center in New York, NY. I serve as Executive Director of the Center for Transgender Medicine and Surgery at Mount Sinai. I also hold an academic appointment as Professor of Medicine in Mount Sinai's Icahn School of Medicine. A true and correct copy of my CV is attached hereto as Exhibit A.

6. I have been Board Certified in Endocrinology, Diabetes and Metabolism by the American Board of Internal Medicine since 1997.

7. I graduated from the University of Wisconsin in Madison with a Bachelor of Science degree in 1986. I earned my Doctor of Medicine degree from the University of Wisconsin in 1990. I completed intern and resident training at Mount Sinai School of Medicine, Beth Israel Medical Center in New York, New York from 1990 to 1993. From 1993 to 1994, I was a Clinical Fellow in Endocrinology at Harvard Medical School and Beth Israel Deaconess Medical Center in Boston, Massachusetts. I stayed at the same institution, serving as a Clinical and Research Fellow in Endocrinology under Fredric Wondisford, from 1994 to 1996.

8. Since 1997, I have evaluated and treated patients along with conducting research in endocrinology. Since 2004, my patient care and research has been focused on the medicine/science specific to transgender people. I have led several other programs either in transgender medicine or in general endocrinology. In particular, I served as the Medical Director of the Center for Transgender Medicine and Surgery, Boston Medical Center, Boston, MA (2016-2018); as the Director of Medical Education, Endocrinology Section, Boston University School of Medicine, Boston, MA (2007-2018); as the Program Director for Endocrinology Fellowship Training, Boston University Medical Center, Boston, MA (2007-2018); and as Director of the Thyroid Clinic, Boston Medical Center, Boston, MA (1999-2003).

9. I have authored or coauthored over 100 peer-reviewed papers including many critical reviews; textbook chapters; and case reports in endocrinology and transgender medicine.

10. Among my publications are the latest review of transgender medicine in the New England Journal of Medicine and the latest review of transgender medicine in the Annals of Internal Medicine. *See* Safer JD, Tangpricha V. Care of transgender persons. *N Engl J Med* 2019; 381:2451-2460; Safer JD, Tangpricha V. Care of the transgender patient. *Ann Intern Med* 2019; 171:ITC1-ITC16. I am also a co-author of the sections of UpToDate that relate to gender-

affirming hormone treatment for transgender people. UpToDate is an evidence-based, physician authored, on-line medical guide and is currently the most widely used such guide among medical providers.

11. I was the inaugural President of the United States Professional Association for Transgender Health ("USPATH"). I have served in several other leadership roles in professional societies related to endocrinology and transgender health. These societies include the Alliance of Academic Internal Medicine, the American College of Physicians Council of Subspecialty Societies, the American Board of Internal Medicine, the Association of Program Directors in Endocrinology and Metabolism, and the American Thyroid Association.

12. Since 2014, I have held various roles as a member of the World Professional Association for Transgender Health ("WPATH"), the leading international organization focused on transgender health care. WPATH has approximately 2,000 members throughout the world and is comprised of physicians, psychiatrists, psychologists, social workers, surgeons, and other health professionals who specialize in health care for transgender people. From 2016 to the present, I have served on the Writing Committee for Standards of Care for the Health of Transsexual, Transgender, and Gender Nonconforming People.

13. I have served in various roles as a member of the Endocrine Society since 2014. I served on a nine-expert Task Force to develop the Endocrine Treatment of Transgender Persons Clinical Practice Guideline from 2014 to 2017. The experts on the Task Force which included me, a methodologist, and a medical writer co-authored the "Endocrine Treatment of Gender-Dysphoria/Gender Incongruent Persons: An Endocrine Society Clinical Practice Guideline," ("Endocrine Society Guidelines"), available at https://academic.oup.com/jcem/article/102/11/3869/4157558.

14. I have served as a Transgender Medicine Guidelines Drafting Group Member for the International Olympic Committee ("IOC") since 2017.

15. Since 2019, I have also served as a drafting group member of the transgender medical guidelines of World Athletics, formerly known as the International Amateur Athletic Federation ("IAAF").

16. I have not previously testified as an expert witness in either deposition or at trial. I am being compensated at an hourly rate of $250 per hour for preparation of expert declarations and reports, and $400 per hour for time spent preparing for or giving deposition or trial testimony. My compensation does not depend on the outcome of this litigation, the opinions I express, or the testimony I provide.

RELEVANT MEDICAL AND SCIENTIFIC BACKGROUND

17. "Gender identity" is the medical term for a person's internal, innate sense of belonging to a particular sex. *See* Endocrine Society Guidelines, Tbl.1 *and* Safer JD, Tangpricha V. Care of transgender persons. *N Engl J Med* 2019; 381:2451–2460, Tbl.1.

18. Although the detailed mechanisms are unknown, there is a medical consensus that there is a significant biologic component underlying gender identity. Safer JD, Tangpricha V. Care of transgender persons. *N Engl J Med* 2019; 381:2451-2460; Safer JD, Tangpricha V. Care of the transgender patient. *Ann Intern Med* 2019; 171:ITC1-ITC16. A person's gender identity is durable and cannot be changed by medical intervention.

19. The terms "gender identity," "gender roles," and "gender expression" refer to different things.

20. Gender roles are behaviors, attitudes, and personality traits that a society (in a given culture and historical period) designates as masculine or feminine and/or that society

associates with or considers typical of the social role of men or women. *See* Endocrine Society Guidelines Tbl.1. The convention that girls wear pink and have longer hair, or that boys wear blue and have shorter hair, are examples of socially constructed gender roles from a particular culture and historical period.

21. By contrast, "gender identity" does not refer to a set of socially contingent behaviors, attitudes, or personality traits that a society designates as masculine or feminine. It is an internal and largely biological phenomenon.

22. Gender expression is how a person communicates gender identity both internally and to others. *See* Safer JD, Tangpricha V. Care of transgender persons. *N Engl J Med* 2019; 381:2451–2460, Tbl.1. For example, a person with a female gender identity might express her identity through typically feminine outward expressions of gender roles like wearing longer hair or more typically feminine clothing.

23. The phrase "biological sex" is an imprecise term that can cause confusion. A person's sex encompasses the sum of several different biological attributes, including sex chromosomes, certain genes, gonads, sex hormone levels, internal and external genitalia, other secondary sex characteristics, and gender identity. Those attributes are not always aligned in the same direction. *See* Endocrine Society Guidelines; Safer JD, Tangpricha V. Care of transgender persons. *N Engl J Med* 2019; 381:2451–2460.

24. Before puberty, boys and girls typically have the same levels of circulating testosterone. After puberty, the typical range of circulating testosterone for non-transgender women is similar to before puberty (<1.7 nmol/L), and the typical range of circulating testosterone for non-transgender men is 9.4-35 nmol/L. *See* Endocrine Society Guidelines (p 3888) *and* Safer JD, Tangpricha V. Care of transgender persons. *N Engl J Med* 2019.

25. Before puberty, age-grade competitive sports records show minimal or no differences in athletic performance between non-transgender boys and non-transgender girls before puberty. But after puberty, non-transgender boys and men as a group have better average performance outcomes in most athletic competitions when compared to non-transgender girls and women as a group. Based on current research comparing non-transgender boys and men with non-transgender girls and women before, during, and after puberty, the primary known biological driver of these average group differences is testosterone starting at puberty, and not reproductive biology or genetics. *See* Handelsman DJ, et al. Circulating testosterone as the hormonal basis of sex differences in athletic performance. *Endocrine Reviews* 2018; 39:803–829, (p 820) (summarizing evidence rejecting hypothesis that physiological characteristics are driven by Y chromosome).

26. Although there are ranges of testosterone that are considered typical for non-transgender men and women, many non-transgender women have testosterone levels outside the typical range.

a. Approximately 6% to 10% of women have a condition called polycystic ovary syndrome (PCOS), which can raise women's testosterone levels up to 4.8 nmol/L.

b. Some elite female athletes have "46,XY DSDs," a group of conditions where individuals have XY chromosomes but are born with typically female external genitalia and assigned a female sex at birth. Among individuals with 46,XY DSD some may have inactive testosterone receptors (a syndrome called "complete androgen insensitivity syndrome, CAIS") which means they don't respond to testosterone despite very high levels. Usually, these individuals have female gender identity and have external genitalia

that are typically female. They do not develop the physical characteristics associated with typical male puberty.

c. Other individuals with 46,XY DSD may have responsive testosterone receptors. These individuals may have female gender identity but at puberty they may start to develop higher levels of testosterone along with secondary sex characteristics that are typically masculine.

WORLD ATHLETICS POLICIES FOR WOMEN WITH HYPERANDROGENISM AND WOMEN WHO ARE TRANSGENDER

27. World Athletics is the international governing body for the sport of track-and-field athletics. Beginning in 2011, World Athletics (then known as IAAF) began requiring that women with elevated levels of circulating testosterone lower their levels of testosterone below a threshold amount in order to compete in elite international women's sports competitions. Under the 2011 regulations, women with hyperandrogenemia (defined as serum testosterone levels above the normal range) were allowed to compete only if they demonstrated that they had testosterone levels below 10 nmol/L or that they had CAIS, preventing their bodies from responding to testosterone.[1]

28. In 2018 the IAAF issued revised regulations lowering the maximum testosterone threshold to 5 nmol/L.[2] The revised regulations were upheld by the Court of Arbitration for Sport ("CAS") in 2019.

[1] A copy of the 2011 regulation is available at https://www.bmj.com/sites/default/files/response_attachments/2014/06/IAAF%20Regulations%20(Final)-AMG-30.04.2011.pdf

[2] A copy of the 2018 regulations is available at https://www.iaaf.org/download/download?filename=fd2923ad-992f-4e43-9a70-78789d390113.pdf&urlslug=IAAF%20Eligibility%20Regulations%20for%20the%20Female%20Classification%20%5BAthletes%20with%20Differences%20of%20Sex%20Development%5D%20in%20force%20as%20from%208%20May%202019

29. In 2019, the IAAF adopted regulations allowing women who are transgender to participate in elite international women's sports competitions if their total testosterone level in serum is beneath a particular threshold for at least one year before competition. The IAAF set the threshold at 5 nmol/L, which was the same threshold set by the IAAF's 2018 regulations for non-transgender women with hyperandrogenism that had been upheld by the CAS when contested.[3]

30. The IAAF rules are consistent with the Endocrine Society Guidelines for the treatment of women who are transgender, which recommend that hormone therapy target circulating testosterone levels to a typical female range at or below 1.7 nmol/L (Endocrine Society Guidelines, p. 3887) and with the study of testosterone levels achieved in practice by medically treated women who are transgender (Liang JJ, et al. Testosterone levels achieved by medically treated transgender women in a United States endocrinology clinic cohort. *Endocrine Practice* 2018; 24:135-142).

INTERNATIONAL OLYMPIC COMMITTEE POLICIES FOR WOMEN WHO ARE TRANSGENDER

31. Formal eligibility rules for the participation of transgender women in the Olympics were published in 2003. The 2003 rules required that transgender women athletes could compete in women's events only if they had genital surgery, a gonadectomy (*i.e.*, removal of the testes), and legal documentation of female sex.[4]

[3] A copy of the 2019 regulations is available at https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwi8qbOnsNL0AhUBkIkEHWdpAiQQFnoECAUQAQ&url=https%3A%2F%2Fwww.worldathletics.org%2Fdownload%2Fdownload%3Ffilename%3Dace036ec-a21f-4a4a-9646-fb3c40fe80be.pdf%26urlslug%3DC3.5%2520-%2520Eligibility%2520Regulations%2520Transgender%2520Athletes&usg=AOvVaw1aPuD3gUoz5hcGKgmumVb5

[4] A copy of the 2003 policy is available at https://olympics.com/ioc/news/ioc-approves-consensus-with-regard-to-athletes-who-have-changed-sex-1

32. However, many women who are transgender are treated with medicines alone and don't have gonadectomy. As well, many jurisdictions do not have systems to document the sex of transgender people. In some jurisdictions, being transgender is illegal, and disclosure that someone is transgender can be unsafe.

33. Therefore, in 2015, the IOC adopted new guidance modeled after the IAAF's 2011 regulations for non-transgender women with hyperandrogenism. Under the 2015 IOC guidance, women who are transgender were required to demonstrate that their total testosterone level in serum was below 10 nmol/L for at least one year prior to competition. The 10 nmol/L threshold was the same threshold set by the IAAF's 2011 regulations.[5]

34. In 2021, the IOC adopted a new "Framework on Fairness, Inclusion, and Non-Discrimination on the Basis of Gender Identity and Sex Variations" (the "2021 framework"), which replaces the 2015 guidance.[6]

35. Unlike the IOC's 2003 and 2015 policies, the IOC's 2021 framework does not attempt to adopt a single set of eligibility standards for the participation of transgender athletes that would apply universally to every IOC sport. Instead, the 2021 framework provides a set of governing principles for sporting bodies to follow when adopting eligibility rules for their particular sport.

36. Under the 2021 framework, ".[n]o athlete should be precluded from competing or excluded from competition on the .exclusive ground of an unverified, alleged or perceived unfair

[5] A copy of the 2015 policy is available at https://stillmed.olympic.org/Documents/Commissions_PDFfiles/Medical_commission/2015-11_ioc_consensus_meeting_on_sex_reassignment_and_hyperandrogenism-en.pdf

[6] A copy of the 2021 framework is available at https://stillmed.olympics.com/media/Documents/News/2021/11/IOC-Framework-Fairness-Inclusion-Non-discrimination-2021.pdf?_ga=2.207516307.1210589288.1636993769-1638189514.1636993769

competitive advantage due to their sex variations, physical appearance and/or transgender status." Principle 5.1. "Until evidence . . . determines otherwise, athletes should not be deemed to have an unfair or disproportionate competitive advantage due to their sex variations, physical appearance and/or transgender status." Principles 5.2.

37. The 2021 framework further provides that "[a]ny restrictions arising from eligibility criteria should be based on robust and peer reviewed research that: (a) demonstrates a consistent, unfair, disproportionate competitive advantage in performance and/or an unpreventable risk to the physical safety of other athletes; (b) is largely based on data collected from a demographic group that is consistent in gender and athletic engagement with the group that the eligibility criteria aim to regulate; and (c) demonstrates that such disproportionate competitive advantage and/or unpreventable risk exists for the specific sport, discipline and event that the eligibility criteria aim to regulate." Principle 6.1

NCAA POLICIES FOR WOMEN WHO ARE TRANSGENDER

38. Since 2011, the National College Athletics Association ("NCAA") has allowed women who are transgender to participate on the same teams as other women after one year of testosterone suppression. Under the NCAA policy transgender student-athletes certified that they have been on hormone therapy for a period of one year. The NCAA policy did not require ongoing testosterone testing.

39. The NCAA recently announced that it has revised its policy to adopt a "sport-by-sport approach" that "aligns transgender student-athlete participation for college sports with recent policy changes." *See* NCAA Media Center: Board of Governors updates transgender participation policy (Jan. 19, 2022), at https://www.ncaa.org/news/2022/1/19/media-center-board-of-governors-updates-transgender-participation-policy.aspx. "Like the Olympics, the

updated NCAA policy calls for transgender participation for each sport to be determined by the policy for the national governing body of that sport, subject to ongoing review and recommendation by the NCAA Committee on Competitive Safeguards and Medical Aspects of Sports to the Board of Governors." *Id.* The new NCAA policy contemplates that for certain sports, the national governing body for the sport may require transgender athletes "to document sport-specific testosterone levels." *Id.*

PARTICIPATION OF GIRLS AND WOMEN WHO ARE TRANSGENDER IN THE SCHOLASTIC CONTEXT

40. The policies developed by World Athletics and the IOC for transgender athletes were based on the particular context of elite international competition. Not all of the same considerations apply in scholastic contexts.

41. The World Athletics and prior IOC policies were more stringent than the prior NCAA policy because those organizations were concerned with creating policies that cannot be manipulated by governments that are not bound by the rule of law. For example, there have been many well-known examples of state-sponsored doping scandals. The Russian Olympic team is currently banned from international competition due to an organized doping effort. Also, there have been cases where governments have issued fraudulent birth certificates and identification documents. In 2000, Yang Yun was a medal winner in Gymnastics from the Chinese team. She later reported that she was 14-years-old at the time in violation of the rule that all athletes for her events had to be at least 16-years-old. In 2008, He Kexin was 14-years-old when participating in Gymnastics for the Chinese team in violation of the same rule that athletes be at least 16-years-old in those events. A new passport for Ms. He had hastily appeared 6 months prior to the Olympic Games that year with a new birth year so that Ms. He could qualify.

42. To confront the significant problem of state-sponsored cheating, World Athletics and the IOC have to develop eligibility criteria for transgender athletes that can be independently verified to prevent manipulation by non-transgender athletes, and that do not depend on the gender marker listed on identification documentation issued by an athlete's home country. Those concerns do not apply to scholastic athletic competitions in the United States. Scholastic athletic associations can rely on school records to show that an athlete is a girl who is transgender and has socially transitioned to live consistently with her gender identity as a girl.

43. The eligibility criteria for World Athletics and the IOC were also created as part of a system in which elite athletes in international competitions are already regulated and monitored in some circumstances like for doping. Within that context, testing female athletes' levels of testosterone is somewhat analogous to the types of restrictions and invasion of privacy that already exist. By contrast, in athletic competitions that are not as heavily regulated and monitored, it is hard to justify singling out girls who are transgender, girls with 46,XY DSDs, or girls who may just appear more typically masculine for special testosterone requirements that impose a significant additional burden.

44. The concerns that animated the World Athletics and prior IOC policies are even more attenuated for students in middle school and high school, where athletes' ages typically range from 11-18, with different athletes in different stages of pubertal development. Increased testosterone begins to affect athletic performance at the beginning of puberty, but those effects continue to increase each year of puberty until about age 18, with the full impact of puberty resulting from the cumulative effect of each year. As a result, a 14, 15, or 16-year old has experienced less cumulative impact from testosterone than a 17 or 18-year old.

45. Finally, unlike elite international competitions, schools and colleges often provide athletic competition as part of a broader educational mission. In that context, when scholastic athletics are a component of the educational process, institutions may adopt policies designed to emphasize inclusion and to provide the most athletic opportunities to the greatest number of people.

WEST VIRGINIA'S HB 3293

46. There is no medical justification for West Virginia's categorical exclusion of girls who are transgender from participating in scholastic athletics on the same teams as other girls.

47. HB 3293 states that "[c]lassification of teams according to biological sex is necessary to promote equal athletic opportunities for the female sex." The law defines "biological sex" as "an individual's physical form as a male or female based solely on the individual's reproductive biology and genetics at birth."

48. West Virginia's definition of "biological sex" does not reflect any medical understanding of that ambiguous term. As noted above, a person's sex encompasses the sum of several different biological attributes, including sex chromosomes, certain genes, gonads, sex hormone levels, internal and external genitalia, other secondary sex characteristics, and gender identity. Those attributes are not always aligned in the same direction. *See* Endocrine Society Guidelines; Safer JD, Tangpricha V. Care of transgender persons. *N Engl J Med* 2019; 381:2451-2460. For example, if West Virginia defines "biological sex" solely based on "reproductive biology and genetics at birth" it is not clear how West Virginia would define the "biological sex" of children with "46,XY DSDs," who have XY chromosomes but typically female external reproductive anatomy.

49. Even as applied to people without intersex characteristics or 46,XY DSDs, the statutory definition of "biological sex" is inconsistent with West Virginia's stated goal of "promot[ing] equal athletic opportunities for the female sex." By excluding girls who are transgender based on "biological sex," and defining that term to mean "reproductive biology and genetics at birth," West Virginia categorically prevents girls who are transgender from participating on girls' teams regardless of whether they are pre-pubertal, receiving puberty blockers, or receiving gender-affirming hormone therapy. But based on current research, the primary known biological cause of average differences in athletic performance between non-transgender men as a group and non-transgender women as a group is circulating testosterone—not "reproductive biology and genetics at birth." A person's genetic makeup and internal and external reproductive anatomy are not useful indicators of athletic performance and have not been used in elite competition for decades.

50. With respect to average athletic performance, girls and women who are transgender and who do not go through endogenous puberty are somewhat similarly situated to women with XY chromosomes who have complete androgen insensitivity syndrome. It has long-been recognized that women with CAIS have no athletic advantage simply by virtue of having XY chromosomes. *See also* Handelsman DJ, *et al.* Circulating testosterone as the hormonal basis of sex differences in athletic performance. Endocrine Reviews 2018; 39:803–29, p .820 (summarizing evidence rejecting hypothesis that physiological characteristics are driven by Y chromosome).

51. HB 3293 is also dramatically out of step with even the most stringent policies of elite international athletic competitions for girls and women who are transgender and who have gone through endogenous puberty. Unlike the policies of the IOC, World Athletics, or the

NCAA, HB 3293 excludes girls and women who are transgender from participating on girls' and women's sports teams even if they have suppressed their circulating levels of testosterone through gender-affirming hormone therapy.

52. Some critics of the prior IOC guidelines and World Athletics and NCAA policies have speculated that lowering the level of circulating testosterone does not fully mitigate the athletic advantage derived from endogenous puberty. But there is no basis to assert with any degree of confidence that this hypothesis is true. Based on the limited data available, it is equally or more plausible to hypothesize that women who are transgender could be at a net *disadvantage* in particular sports after receiving gender affirming hormone therapy, as compared to non-transgender women.

53. For example, transgender women who go through typically male puberty will tend to have larger bones than non-transgender women, even after receiving gender-affirming hormone therapy. But larger bones may be a disadvantage for transgender women who have typically female levels of circulating testosterone. Muscle mass will be decreased with the shift to female levels of circulating testosterone. Having larger bones without corresponding levels of testosterone and muscle mass would mean that a runner has a bigger body to propel with less power to propel it.

54. Similarly, in a sport where athletes compete in different weight classes (*e.g.* weight lifting), the fact that a transgender woman has bigger bones may be a disadvantage because her ratio of muscle-to-bone will be much lower than the ratio for other women in her weight class who have smaller bones.

55. There are only two studies examining the effects of gender-affirming hormone therapy on the athletic performance of transgender female athletes. The first is a small study of

eight long-distance runners who are transgender women. The study showed that after undergoing gender-affirming medical intervention, which included lowering their testosterone levels, the athletes' performance was reduced so that their performance when compared to non-transgender women was proportionally the same as their performance had been before treatment relative to non-transgender men. *See* Harper J. Race times for transgender athletes. *Journal of Sporting Cultures and Identities* 2015; 6:1–9.

56. A more recent study retrospectively reviewed the military fitness test results of 46 transgender women in the U.S. Air Force before and after receiving gender-affirming hormone therapy. These authors found that any advantage transgender women had over non-transgender women in performing push-ups and sit-ups was negated after 2 years. The study also found that before beginning gender affirming hormone therapy, transgender women completed the 1.5 mile run 21% faster on average than non-transgender women; and after 2 years of gender-affirming hormone therapy, transgender women completed the 1.5 mile run 12% faster on average than non-transgender women. *See* Roberts TA, Smalley J, Ahrendt D. Effect of gender affirming hormones on athletic performance in transwomen and transmen: implications for sporting organisations and legislators. *Br J Sports Med*. 2020.

57. Neither of these limited studies proves there are meaningful athletic advantages for transgender women after receiving gender-affirming hormone therapy, which could only be shown by longitudinal transgender athlete case-comparison studies that control for variations in hormonal exposure and involve numerous indices of performance. Moreover, the ability to perform push-ups and sit-ups or to run 1.5 miles does not necessarily translate into an athletic advantage in any particular athletic event. Because different sports require different types of physical performance, the studies suggest that the existence and extent of a performance

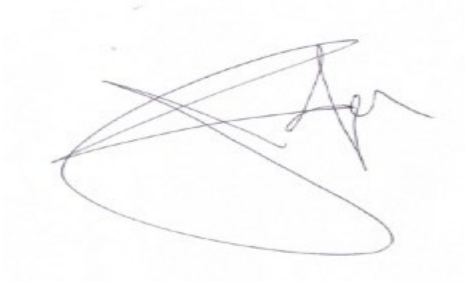
advantage may vary from sport to sport and should not be subject to a categorical across-the-board rule.

58. Even if evidence were eventually to show that on average transgender women have some level of advantage compared to average non-transgender women, those findings would have to be placed in context of all the other intra-sex genetic variations among athletes that can enhance athletic performance among different women or different men.

59. For example, in the academic literature, there are gene sequence variations that can be associated with athleticism referred to as "performance enhancing polymorphisms" or "PEPs." A PEP is a variation in the DNA sequence that is associated with improved athletic performance. For example, variations in mitrochondrial DNA have been associated with greater endurance capacity and greater mitochondrial density in muscles. Other PEPs are associated with blood flow or muscle structure. *See* Ostrander EA, et al. Genetics of athletic performance. *Annu Rev Genomics Hum Genet* 2009; 10:407–429.

60. As the IOC's 2021 framework recognizes, there is no inherent reason why transgender women's physiological characteristics related to athletic performance should be treated as any more of an "unfair" advantage than the advantages that already exist among different women athletes. The 2021 framework instructs that, even at the most elite level of competition, sporting organizations should base eligibility restrictions on whether there exists "a consistent, unfair, and disproportionate competitive advantage" when viewed within the broader context of all the other intra-sex variations that may give a comparative athletic advantage to a particular athlete.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.



Executed on January 21, 2022 Joshua D. Safer, MD, FACP, FACE

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EXHIBIT A

CURRICULUM VITAE

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Academic Training

1990 MD	University of Wisconsin School of Medicine, Madison, WI
1986 BS	University of Wisconsin, Madison, WI, Economics

Postdoctoral Training

1994 - 1996	Clinical and Research Fellow, Endocrinology, under Fredric Wondisford, Harvard Medical School - Beth Israel Deaconess Medical Center, Boston, MA
1993 - 1994	Clinical Fellow, Endocrinology, Harvard Medical School and Beth Israel Deaconess Medical Center, Boston, MA
1990 - 1993	Intern and Resident, Department of Medicine, The Mount Sinai School of Medicine, Beth Israel Medical Center, New York City, NY

Academic Appointments

2019 - present	Professor of Medicine, Icahn School of Medicine at Mount Sinai, New York, NY
2006 - 2018	Associate Professor of Medicine and Molecular Medicine, Boston University School of Medicine
1999 - 2005	Assistant Professor of Medicine, Boston University School of Medicine
1996 - 1999	Instructor in Medicine, Harvard Medical School
1993 - 1996	Fellow in Medicine, Harvard Medical School

Hospital Appointments

2018 - present	Staff Physician, The Mount Sinai Hospital, New York City, NY
2018 - present	Staff Physician, Mount Sinai Beth Israel Medical Center, New York City, NY
1999 - 2018	Staff Physician, Boston University Medical Center, Boston, MA
2001 - 2006	Staff Physician, Veterans Administration Boston Health Care, Boston, MA
1996 - 1999	Staff Physician, Beth Israel Deaconess Medical Center, Boston, MA
1990 - 1993	House Staff, Beth Israel Medical Center, New York City, NY

Other Medical Staff Appointments

2004 - 2013	Staff Physician, Massachusetts Institute of Technology Medical, Cambridge, MA
1994 - 1999	Physician, Harvard Vanguard Medical Associates, Boston, MA
1987 - 1996	Captain, United States Army Reserve, Medical Corps

Honors:

2019	Fellow, American College of Endocrinology
2019	Preaw Hanseree Memorial Lecture, University of Wisconsin-Madison
2017	Lesbian, Gay, Bisexual and Transgender Health Award, Massachusetts Medical Society
2012	Outstanding Service Award, Association of Program Directors in Endocrinology and Metabolism
2007	Fellow, American College of Physicians
2004	Boston University School of Medicine Outstanding Student Mentor Award
2001	Abbott Thyroid Research Advisory Council Award
1996	Knoll Thyroid Research Clinical Fellowship Award, Endocrine Society
1995	Trainee Investigator Award for Excellence in Scientific Research, American Federation for Clinical Research (AFCR)
1994	Trainee Investigator Award for Excellence in Scientific Research, AFCR
1990	The University of Wisconsin Medical Alumni Association Award
1988-1990	Senior Class President, University of Wisconsin, School of Medicine

Licensure and Certification

1997	Board Certification in Endocrinology, Diabetes and Metabolism, American Board of Internal Medicine, recertified 2007, 2017
1994	Board Certification in Internal Medicine, American Board of Internal Medicine, recertified 2007
1993	Massachusetts License Registration #77459, inactive
1990	New York License Registration #187263-1

Departmental and University Committees

Icahn School of Medicine at Mount Sinai

2020-present	Mount Sinai Disparities and Equity Research Taskforce Steering Committee

Boston Medical Center

2016-2018	Physician Satisfaction Task Force, Department of Medicine
2016-2018	Transgender Patient Task Force
2006-2017	Pharmacy and Therapeutics Committee, Health Net Plan

Boston University School of Medicine

2009-2018	Admissions Committee
2005	Review Committee, Department of Medicine Pilot Project Grants
2000	Residency and Fellowship Core Curriculum Committee,
2000-2018	Internship Selection Committee, Residency Program in Medicine

Boston University Goldman School of Dental Medicine

2003-2018 Course Directors Committee, Goldman School of Dental Medicine

Teaching Experience and Responsibilities

Icahn School of Medicine at Mount Sinai

2019-present Lecturer in Endocrinology, Second-year Pathophysiology Course

Tufts University School of Medicine

2016-2018 Lecturer in Endocrinology, Second-year Pathophysiology Course

Boston University School of Medicine

2003-2018 Course Director, Disease and Therapy - Endocrinology Section

1999-2018 Regular lectures to medical students, residents, and fellows on thyroid disease, diabetes insipidus, and transgender medicine

Boston University Goldman School of Dental Medicine

2002-2018 Course Director, General Medicine and Dental Correlations

2002-2018 Course Director, Medical Concerns in the Dental Patient

Major Administrative Responsibilities

2018-present	Executive Director, Center for Transgender Medicine and Surgery, Mount Sinai Health System, New York City, NY
2016-2018	Medical Director, Center for Transgender Medicine and Surgery, Boston Medical Center, Boston, MA
2007-2018	Director, Medical Education, Endocrinology Section, Boston University School of Medicine, Boston, MA
2007-2018	Program Director, Endocrinology Fellowship Training, Boston University Medical Center, Boston, MA
1999-2003	Director, Thyroid Clinic, Boston Medical Center, Boston, MA

Other Professional Activities

Professional Societies: Memberships

2016-present	United States Professional Association for Transgender Health (USPATH)
2014-present	World Professional Association for Transgender Health (WPATH)
2007-present	Association of Program Directors in Endocrinology and Metabolism (APDEM)
2007-present	Association of Specialty Professors (ASP), Alliance of Academic Internal Medicine (AAIM)
1999-present	American Association of Clinical Endocrinologists
1998-2018	American Thyroid Association
1995-present	Endocrine Society
1994-present	American College of Physicians
1994-1996	American Federation for Medical Research
1993-2018	Massachusetts Medical Society

Professional Societies: Offices Held and Committee Assignments

International

World Athletics (formerly IAAF)

2019-present	Drafting Group Member, Transgender Medical Guidelines

International Olympic Committee (IOC)

2017-present	Drafting Group Member, Transgender Medical Guidelines

World Professional Association for Transgender Health (WPATH)

2016-present	Writing Committee Member, Standards of Care for the Health of Transsexual, Transgender, and Gender Nonconforming People
2016-2018	Co-Chair, Scientific Committee, International Meeting, Buenos Aires - 2018
2015-2016	Chair, Scientific Committee, International Meeting, Amsterdam - 2016
2015-present	Task Force Member, Global Education Institute
2015-present	Media Liaison

TransNet – International Consortium for Transgender Medicine and Health Research
2014-present Secretary and Co-Chair, Steering Committee

National

United States Professional Association for Transgender Health (USPATH)
2018-2019 President

Alliance of Academic Internal Medicine
2016-2019 Chair, Compliance Committee
2016-2017 Committee member, Compensation
2015-2016 President, Association of Specialty Professors (ASP)
2014-2017 Council member
2014-2019 Task Force member, Program Planning
2014-2019 Work Group member, Survey Center
2013-2015 Chair, Program Planning Committee, ASP
2012-2017 Council member, ASP
2012-2013 Chair, Membership Services Committee, ASP
2010-2015 Chair, Program Directors Site Visit Training Seminar, ASP
2007-2013 Committee member, Membership Services, ASP

American College of Physicians
2016-2018 Council of Subspecialty Societies member

Endocrine Society
2020-present Transgender Medicine, Special Interest Group member
2017-present Advisory Board member, Transgender/Disorders of Sex Development
2017-2020 Committee member, Clinical Endocrine Education
2014-present Media Liaison for Transgender Medicine
2014-2017 Task Force member, Endocrine Treatment of Transgender Persons Clinical Practice Guideline

American Board of Internal Medicine
2013-2018 Task Force member, Endocrinology Procedures
2013 Task Force member, ASP/AAIM/ACGME/ABIM Joint Next Accreditation System Internal Medicine Subspecialty Milestones

Association of Program Directors in Endocrinology and Metabolism
2017-2018 Secretary-Treasurer
2012-2018 Task Force member, Next Accreditation System Endocrinology Milestones
2011-2012 Task Force member, Procedures Accreditation
2010-2012 Council member
2009-2016 Chair, Site Visit/Curriculum Web-Toolbox Committee

American Thyroid Association
2006-2009 Publications Committee member
2004 Program Committee member

Editorships and Editorial Boards

2018-present	Associate Editor, *Transgender Health*
2017-present	Editorial Advisory Board, *Endocrine News*
2016-present	Transgender Section Co-Editor, *UpToDate*
2015-present	Editorial Board, *Transgender Health*
2015-present	Editorial Board, *International Journal of Transgender Health*
2013-2018	Associate Editor, *Journal of Clinical & Translational Endocrinology*
2007-present	Editorial Board, *Endocrine Practice*

External Medical Advising and Consulting

International

2016-present	International transgender athlete guidelines, Medical and Scientific Commission, International Olympic Committee

National

2017	Transgender medical and surgical treatment, National Collegiate Athletic Association,
2017	Safety for transgender medical treatment, Food and Drug Administration, United States
2015-present	Transgender workforce and military readiness, Department of Defense, United States
2014	Transgender prison population health, Federal Bureau of Prisons, United States

Regional

2011-2018	Transgender prison population health, Massachusetts Department of Correction

Past Other Support

2018-2022	Keith Haring Foundation, **PI: Joshua D. Safer**, Pilot Program to Develop Clinical Program in Transgender Medicine for Children and Adolescents
2015-2016	R13 HD084267, **Multi-PI: Joshua D. Safer**, TransNet: Developing a Research Agenda in Transgender Health and Medicine
2014-2015	Boston Foundation, Equality Fund, **PI: Joshua D. Safer**, Pilot Program to Educate Physicians in Transgender Medicine
2013-2014	Evans Foundation, **PI: Joshua D. Safer**, A Pilot Curriculum in Transgender Medicine
2001-2003	Thyroid Research Advisory Council, **PI: Joshua D. Safer**, Thyroid Hormone Action on Skin
2001-2002	Evans Foundation, **PI: Joshua D. Safer**, Thyroid Hormone Action on Skin
1996-2001	K08 DK02423, **PI: Joshua D. Safer**, Characterization of Central Resistance to Thyroid Hormone

Conferences Organized

International Conferences

World Professional Association for Transgender Health

November, 2020 Bi-annual meeting, Planning Committee (remote)

November, 2018 Bi-annual meeting, Scientific Co-Chair, Buenos Aires, Argentina

June, 2016 Bi-annual meeting, Scientific Co-Chair, Amsterdam, Netherlands

November, 2015 Global Education Initiative, inaugural conference, Chicago, IL

TransNet – International Consortium for Transgender Health and Medicine Research

May, 2016 International meeting to set transgender medicine research priorities, Amsterdam, Netherlands

May, 2015 NIH conference to set transgender medicine research priorities, Bethesda, MD

June, 2014 Inaugural meeting, Chicago, IL

National Conferences

February, 2019 Live Surgery Course for Gender Affirmation Procedures, Mount Sinai Hospital and WPATH, New York City, NY

April, 2018 Live Surgery Course for Gender Affirmation Procedures, Mount Sinai Hospital and WPATH, New York City, NY

January, 2017 United States Professional Association for Transgender Health (USPATH) bi-annual meeting, Los Angeles, CA

November, 2015 NIH/Alliance for Academic Internal Medicine - Physician Researcher Workforce Taskforce Meeting, Washington, DC

October, 2015 National Internal Medicine Subspecialty Summit, Atlanta, GA

June, 2013 Special Symposium: “Transgender Medicine – What Every Physician Should Know” Annual Meeting of the Endocrine Society, San Francisco, CA

April, 2011 2011 ASP Accreditation Seminar "Meeting the ACGME and RRC-IM Standards for Successful Fellowship Programs" Arlington, VA

Alliance for Academic Internal Medicine

April, 2015 2015 ASP Accreditation Seminar “Moving Your Fellowship Program Forward” Spring Meeting, Houston, TX

April, 2014 2014 ASP Accreditation Seminar “NAS for Medical Subspecialties Is Almost Here” Spring Meeting, Nashville, TN

May, 2013 2013 ASP Accreditation Seminar "A Changing Landscape in Subspecialty Fellowship Education" Spring Meeting, Lake Buena Vista, FL

April, 2012 2012 ASP Accreditation Seminar "Meeting ACGME and RRC-IM Standards for Successful Fellowship Programs" Spring Meeting, Atlanta, GA

Invited Lectures and Presentations

International

January, 2020 "Transgender Medicine", World Professional Association for Transgender Health Global Education Initiative, Hanoi, Vietnam

September, 2019 "Transgender Women" International Association of Athletics Federations (IAAF), Lausanne, Switzerland

November, 2018 "Transgender Medicine", World Professional Association for Transgender Health Annual Meeting, Buenos Aires, Argentina

October, 2018 "Transgender Medicine", Canadian Endocrine Diabetes Meeting, Halifax, NS, Canada

June, 2018 "21ˢ-Century Strategies: Transgender Hormone Care" CMIN Summit 2018, Porto, Portugal

February, 2017 "A 21st-Century Framework to for Transgender Medical Care" Sheba Hospital, Tel Aviv, Israel

October, 2016 "A 21st-Century Approach to Hormone Treatment of Transgender Individuals" EndoBridge, Antalya, Turkey

May, 2016 "Transgender Women" International Olympic Committee Headquarters, Lausanne, Switzerland

October, 2015 "Workshop on Guidelines for Transgender Health Care" Canadian Professional Association for Transgender Health, Halifax, NS

March, 2015 "Endocrinology - Hormone Induced Changes" Transgender Health Care in Europe, European Professional Association for Transgender Health, Ghent, Belgium

June, 2014 "What to Know to Feel Safe Providing Hormone Therapy for Transgender Patients" International Congress of Endocrinology, Chicago, IL

September, 2011 "Transgender Therapy – The Endocrine Society Guidelines" World Professional Association for Transgender Health, Atlanta, GA

February, 2007 "Treating skin disease by manipulating thyroid hormone action" Grand Rounds, Meier Hospital, Kfar Saba, Israel

March, 2004 "New Directions in Thyroid Hormone Action: Skin and Hair" Grand Rounds, Meier Hospital, Kfar Saba, Israel

National

May, 2021 "Transgender Medicine", University of Cincinnati Medicine Grand Rounds, Cincinnati, OH (scheduled)

September, 2020 "Transgender Medicine", Peds Place Conference, University of Arkansas, AR (remote)

September, 2020 "Transgender Medicine", University of California-Irvine Medicine Grand Rounds, Irvine, CA (remote)

June, 2020 "Transgender Medicine", Inova Fairfax Medicine Grand Rounds, Fairfax, VA (remote)

December, 2019 "Transgender Medicine", Vanderbilt University Surgery Grand Rounds, Nashville, TN

November, 2019 "Transgender Medicine", Medical College of Wisconsin CME, Milwaukee, WI

September, 2019 "Transgender Medicine", Beth Israel Deaconess Medicine Grand Rounds, Boston, MA

September, 2019 "Transgender Medicine", United States Professional Association for Transgender Health Annual Meeting, Washington, DC

June, 2019 "Transgender Medicine", Mount Sinai Hospital Internal Medicine CME, New York, NY

April, 2019 "A 21st-Century Strategy for Hormone Treatment of Transgender Individuals" National Transgender Health Summit, Oakland, CA

March, 2019 "Transgender Medicine" National Eating Disorders Meeting, New York, NY

January, 2019 "Transgender Medicine" Yale School of Medicine Obstetrics and Gynecology Grand Rounds, New Haven, CT

January, 2019 "Transgender Medicine" Yale School of Medicine Endocrinology Grand Rounds, New Haven, CT

January, 2019 "Transgender Medicine" Drexel School of Medicine Medicine Grand Rounds, Philadelphia, PA

September, 2018 "Current Guidelines and Strategy for Hormone Treatment of Transgender Individuals" Minnesota-Midwest Chapter - American Association of Clinical Endocrinologists Annual Meeting, Minneapolis, MN

July, 2018 "21st-Century Strategies for Transgender Hormone Care" Ohio River Valley Chapter - American Association of Clinical Endocrinologists Meeting, Indianapolis, IN

June, 2018 "21s-Century Strategies: Transgender Hormone Care" University of Connecticut School of Medicine, Hartford, CT

May, 2018 "A 21st-Century Strategy for Hormone Treatment of Transgender Individuals" American Association of Clinical Endocrinologists Annual Meeting, Boston, MA

March, 2018 "21st-Century Strategies for Transgender Hormone Care" New Jersey Chapter - American Association of Clinical Endocrinologists Meeting, Morristown, NJ

February, 2018 "A Strategy for the Medical Care of Transgender Individuals" Keynote Address for the International Society for Clinical Densitometry Annual Meeting, Boston, MA

November, 2017 "A 21st-Century Strategy for Hormone Treatment of Transgender Individuals" National Transgender Health Summit, Oakland, CA

September, 2017 "Transgender Therapy – The Endocrine Society Guidelines" Endocrine Society: Clinical Endocrinology Update, Chicago, IL

May, 2017 "Transgender Medicine – a 21st Century Strategy for Patient Care" University of Arizona College of Medicine, Tucson, AR

April, 2017 "Transgender Care Across the Age Continuum" Annual Meeting of the Endocrine Society, Orlando, FL

March, 2017 "A 21st-Century Approach to Hormone Treatment of Transgender Individuals" Brown University School of Medicine, Providence, RI

March, 2017 "What to Know: A 21st-Century Approach to Transgender Medical Care" United States Food and Drug Administration (FDA), Washington, DC

February, 2017 "A 21st-Century Approach to Transgender Medical Care" United States Professional Association for Transgender Health, Los Angeles, CA

February, 2017 "A 21st-Century Approach to Hormone Treatment of Transgender Individuals" Southern States American Association of Clinical Endocrinologists Annual Meeting, Memphis, TN

December, 2016 "Transgender Medical Care in the United States Armed Forces" Global Education Initiative, World Professional Association for Transgender Health, Arlington, VA

December, 2016 "Foundations in Hormone Treatment" Global Education Initiative, World Professional Association for Transgender Health, Arlington, VA

November, 2016 "Developing a Transgender/Gender-Identity Curriculum for Medical Students" Association of American Medical Colleges National Meeting, Seattle, WA

September, 2016 "A 21st-Century Approach to Hormone Treatment of Transgender Individuals" Endocrine Society: Clinical Endocrinology Update, Seattle, WA

August, 2016 "A 21st-Century Approach to Hormone Treatment of Transgender Individuals" Oregon Health and Science University Ashland Endocrine Conference, Ashland, OR

March, 2016 "State-of-the-Art: Use of Hormones in Transgender Individuals" Annual Meeting of the Endocrine Society, Boston, MA

October, 2015	"What Every Endocrinologist Should Know to Feel Safe Providing Hormone Therapy for Transgender Patients" University of Utah School of Medicine, Salt Lake City, UT
April, 2015	"What to Know –to Feel Safe Providing Hormone Therapy for Transgender Patients" Pritzker School of Medicine, University of Chicago, Chicago, IL
March, 2015	"What to Know –to Feel Safe with Hormone Therapy for Transgender Patients" Annual Transgender Health Symposium, Medical College of Wisconsin, Milwaukee, WI
May, 2014	"Transgendocrinology" Annual Meeting of the American Association of Clinical Endocrinologists, Las Vegas, NV
May, 2013	"Transgender Therapy – Hormone Action and Nuance" National Transgender Health Summit, Oakland, CA
April, 2013	"Transgender Therapy – What Every Provider Needs to Know" Empire Conference: Transgender Health and Wellness, Albany, NY
April, 2013	"Transgender Therapy – What Every Endocrinologist Needs to Know" University of Maryland School of Medicine, Baltimore, MD
November, 2012	"Transgender Therapy – What Every Endocrinologist Should Know" New York University School of Medicine, New York, NY
May, 2010	"Transgender Treatment: What Every Endocrinologist Needs to Know" Brown University School of Medicine, Providence, RI
November, 2009	"New Directions in Thyroid Hormone Action: Skin and Hair" Emory University School of Medicine, Atlanta, GA
November, 2009	"Primary Care Update in the Treatment of Thyroid Disorders" Emory University School of Medicine, Atlanta, GA
October, 2008	"Topical Iopanoic Acid Stimulates Epidermal Proliferation through Inhibition of the Type 3 Thyroid Hormone Deiodinase" Annual Meeting of the American Thyroid Association, Chicago, IL
February, 2005	"New Directions in Thyroid Hormone Action: Skin and Hair" Endocrinology Grand Rounds, University of Minnesota, Minneapolis, MN
February, 2005	"Thyroid Hormone Action on Skin and Hair: What We Thought We Knew" Dermatology Grand Rounds, University of Minnesota, Minneapolis, MN
December, 2004	"Transgender Therapy: The Role of the Endocrinologist" Endocrinology Grand Rounds, Brown Medical Center, Providence, RI
November, 2003	"New Directions in Thyroid Hormone Action: Skin and Hair" Endocrinology Grand Rounds, Dartmouth Medical Center, Hanover, NH

Regional

May, 2021 "Transgender Medicine", New York GYN Society, New York, NY (scheduled)

July, 2020 "Transgender Medicine", LGBT Health Conference CME, New York, NY

February, 2020 "Transgender Medicine", Englewood Hospital Medicine Grand Rounds, Englewood, NJ

February, 2020 "Transgender Medicine", Endocrinology Grand Rounds, Columbia College of Physicians and Surgeons, New York, NY

January, 2020 "Transgender Medicine", CEI, Lake Placid, NY

November, 2019 "Transgender Medicine", Weill Cornell Reproductive Endocrine Grand Rounds, New York, NY

November, 2019 "Transgender Medicine", Acacia Network Grand Rounds, New York, NY

October, 2019 "Transgender Medicine", American Association of Clinical Endocrinologists - New Jersey, annual meeting, Morristown, NJ

October, 2019 "Transgender Medicine", Community Health Network annual conference, New York, NY

October, 2019 "Transgender Medicine", Westchester Medical Center Medicine Grand Rounds, Valhalla, NY

September, 2019 "Transgender Medicine", Weill Cornell Reproductive Endocrine CME, New York, NY

September, 2019 "Transgender Competency for Medical Providers", Working Group on Gender, Columbia College of Physicians and Surgeons, New York, NY

April, 2019 "Transgender Medicine", Weill Cornell Urology Grand Rounds, New York, NY

June, 2018 "21^{s}-Century Strategies: Transgender Hormone Care" Medicine Grand Rounds, Staten Island University Hospital, Staten Island, NY

February, 2018 "Transgender Medicine – 21st Century Strategies for Patient Care" Medicine Rounds, Newton-Wellesley Hospital, Newton, MA

October, 2017 "Transgender Medicine – 21st Century Strategies for Patient Care" Medicine Rounds, Beth Israel-Milton Hospital, Milton, MA

September, 2017 "Transgender Medicine – 21st Century Strategies for Patient Care" Obstetrics-Gynecology Grand Rounds, Brigham and Women's Hospital, Boston, MA

June, 2017 "State-of-the-Art: Hormone Therapy for Transgender Patients" Reproductive Endocrinology Rounds, Massachusetts General Hospital, Boston, MA

May, 2017 "A 21st-Century Strategy for Medical Treatment of Transgender Individuals" Boston Medical Center and Boston University School of Medicine, Boston, MA

March, 2017 "A 21st-Century Strategy for Medical Treatment of Transgender Individuals" Tufts Medicine Grand Rounds, Boston, MA

January, 2017 "What to Know: A 21st-Century Approach to Transgender Medical Care" Internal Medicine Rounds, Brigham and Women's Hospital, Boston, MA

March, 2016 "State-of-the-Art: Hormone Therapy for Transgender Patients" Obstetrics-Gynecology Rounds, Brigham and Women's Hospital, Boston, MA

November, 2015 "What Every Endocrinologist Should Know to Feel Safe Providing Hormone Therapy for Transgender Patients" Endocrinology Rounds, Tufts Medical Center, Boston, MA

May, 2015 "What Every Endocrinologist Should Know to Feel Safe Providing Hormone Therapy for Transgender Patients" Endocrinology Rounds, Massachusetts General Hospital, Boston, MA

December, 2014 "What to Know to Feel Safe Providing Hormone Therapy for Transgender Patients" Endocrinology Rounds, Beth Israel Deaconess Medical Center, Boston, MA

November, 2013 "Transgender Therapy – What Every Physician Should Know" Medicine Grand Rounds, Boston Veterans Administration Hospital, Boston, MA

May, 2005 "Transgender Therapy: The Role of the Endocrinologist", Endocrinology Rounds, Tufts-New England Medical Center, Boston, MA

January, 2004 "New Directions in Thyroid Hormone Action: Skin and Hair", Endocrinology Rounds, Brigham and Women's Hospital, Boston, MA

October, 1999 "The Many Faces of Hypothyroidism", Medicine Grand Rounds, Bedford Veterans Administration Hospital, Bedford, MA

Institutional, Icahn School of Medicine at Mount Sinai, New York, NY

October, 2019 "Transgender Medicine", East Harlem HOP rounds, New York, NY

October, 2019 "Transgender Medicine", Mount Sinai HIV rounds, New York, NY

August, 2019 "Transgender Medicine", Mount Sinai Endocrinology Fellows Conference, New York, NY

February, 2019 "Transgender Medicine", Mount Sinai Endocrinology Grand Rounds, New York, NY

February, 2019 "Transgender Medicine", Mount Sinai Ob-Gyn Grand Rounds, New York, NY

April, 2018 "21st-Century Strategies for Transgender Hormone Care", HIV Grand Rounds

Institutional, Boston University School of Medicine, Boston, MA

March, 2017 "State of the Art Hormone Therapy for Transgender Patients", Section of Infectious Disease

January, 2017 "What you need to know – to supervise care for our transgender patients at BMC", Section of Endocrinology

February, 2016 "State of the Art Hormone Therapy for Transgender Patients", Department of Medicine

November, 2015 "What the Family Medicine Physician Should Know to Feel Safe Providing Hormone Therapy for Transgender Patients", Department of Family Medicine

November, 2014 "What the Anesthesiologist Should Know to Feel Safe Providing Hormone Therapy for Transgender Patients", Department of Anesthesia

January, 2014 "Update on the Current Guidelines for Transgender Hormone Therapy", Section of Endocrinology

October, 2011 "Transgender Therapy – What Every Physician Should Know", Department of Medicine

February, 2011 "Current Guidelines for Transgender Hormone Therapy: What Every Endocrinologist Should Know", Section of Endocrinology

November, 2005 "Thyroiditis and Other Insults to Thyroid Function" Core Curriculum in Adult Primary Care Medicine

November, 2005 "Interpretation of Thyroid Function Tests Made Easy" Core Curriculum in Adult Primary Care Medicine

January, 2005 "Transgender Therapy: The Role of the Endocrinologist" Endocrinology Grand Rounds

December, 2004 "Update in Endocrinology: Thyroid" Medicine Grand Rounds

January, 2004 "New Directions in Thyroid Hormone Action: Skin and Hair" Medicine Grand Rounds

March, 2003 "Thyroid Hormone Action on Hair and Skin" Endocrinology Grand Rounds

November, 1999 "Central Resistance to Thyroid Hormone – From Bedside to Bench" Endocrinology Grand Rounds

Curriculum development with external dissemination

2014-present Web site for Association of Program Directors of Endocrinology and Metabolism (APDEM), which serves as ***the primary resource for endocrinology fellowship program directors throughout the United States and Canada***.

- Sample curricula
- Streaming lectures to support specific curricular needs to feel programmatic gaps at certain programs
- New assessment forms that map skills to milestones that conform to Next Accreditation System (NAS) standards of the Accreditation Council for Graduate Medical Education (ACGME)

2013-present Dissemination of Transgender Medicine Curriculum with local modification to institutions in the United States and Canada

Curriculum adopted

Johns Hopkins School of Nursing (sample video: http://vimeo.com/jhunursing/review/97477269/abbcf6d33a)
Ohio State University College of Medicine
University of British Columbia, Faculty of Medicine
University of Central Florida College of Medicine
Tufts University School of Medicine

Curriculum in development

Dartmouth School of Medicine
University of Vermont College of Medicine

Work in progress in preparation for sharing transgender curriculum

Albany Medical College
Emory School of Medicine
George Washington University Medical School
Hofstra School of Medicine
University of California – San Diego School of Medicine
University of Kentucky College of Medicine
University of Louisville School of Medicine
University of Michigan Medical School
University of Minnesota Medical School
University of Nebraska School of Medicine
University of Pennsylvania School of Medicine
Washington University School of Medicine

2013-2015 Co-author of the ***Medical Subspecialty Reporting Milestones used for evaluation of Internal Medicine subspecialty medicine fellowship programs throughout the Unites States*** by the Accreditation Council for Graduate Medical Education (ACGME).

https://www.acgme.org/acgmeweb/Portals/0/PDFs/Milestones/InternalMedicineSubspecialtyMilestones.pdf

2011-2014 Web site content expert for APDEM, which served as ***the primary resource for endocrinology fellowship Program Directors throughout the United States and Canada***. Materials included sample curricula, streaming lectures to support specific curricular needs to feel programmatic gaps at certain programs, and guidance dealing with ACGME site-visits

Other curriculum development

2019-present Massive Open On-line Course (MOOC) curricular content. Transgender Medicine for General Medical Providers, Icahn School of Medicine at Mount Sinai (https://www.coursera.org/courses?query=transgender%20medicine%20for%20general%20medical%20providers&)

2016-2018 Curricular Content to teach transgender hormone therapy in the LGBT elective at Harvard Medical School

2016-2018 Curricular Content to teach transgender hormone therapy at Tufts University School of Medicine.

2011-2018 Fully revised curriculum for the Boston University Medical Center Fellowship Training Program in Endocrinology, Diabetes and Nutrition.

2010-2018 Curricula to teach transgender hormone therapy at Boston University School of Medicine.

2006-2014 Written examination in endocrinology to complement the multiple-choice examination for medical students — validation relative to success later in medical school is in progress.

Bibliography: (ORCID # 0000 0003 2497 8401)

Names of mentees are underlined throughout the bibliography section

** currently most influential papers are noted with double asterisks

Original, Peer-Reviewed Articles

1. **Safer JD**, Langlois MF, Cohen R, Monden T, John-Hope D, Madura J, Hollenberg AN, Wondisford FE. Isoform variable action among thyroid hormone receptor mutants provides insight into pituitary resistance to thyroid hormone. *Mol Endocrinol* 1997;11(1):16-26. PMID 8994184

2. Langlois MF, Zanger K, Monden T, **Safer JD**, Hollenberg AN, Wondisford FE. A unique role of the beta-2 thyroid hormone receptor isoform in negative regulation by thyroid hormone - mapping of a novel amino-terminal domain important for ligand-independent activation. *J Biol Chem* 1997;272(40):24927-24933. PMID 9312095

3. **Safer JD**, Cohen RN, Hollenberg AN, Wondisford, FE. Defective release of corepressor by hinge mutants of the thyroid hormone receptor found in patients with resistance to thyroid hormone. *J Biol Chem* 1998;273(46):30175-30182. PMID 9804773

4. **Safer JD**, O'Connor MG, Colan SD, Srinivasan S, Tollin SR, Wondisford FE. The TR-beta gene mutation R383H is associated with isolated central resistance to thyroid hormone. *J Clin Endocrinol Metab* 1999;84(9):3099-3109. PMID 10487671

5. **Safer JD**, Fraser LM, Ray S, Holick MF. Topically applied triiodothyronine stimulates epidermal proliferation, dermal thickening, and hair growth in mice and rats. *Thyroid* 2001;1(8):717-724. PMID 11525263

6. Tangpricha V, Chen BJ, Swan NC, Sweeney AT, de las Morenas A, **Safer JD**. Twenty-one gauge needles provide more cellular samples than twenty-five gauge needles in fine needle aspiration biopsy of the thyroid. *Thyroid* 2001;11(10):973-976. PMID 11716046

7. **Safer JD**, Crawford TM, Fraser LM, Hoa M, Ray S, Chen TC, Persons K, Holick MF. Thyroid hormone action on skin: diverging effects of topical versus intraperitoneal administration. *Thyroid* 2003;13(2):159-165. PMID 12699590

8. Santini F, Ceccarini G, Montanelli L, Rosellini V, Mammoli C, Macchia P, Gatti G, Pucci E, Marsili A, Chopra IJ, Chiovato L, Vitto P, **Safer JD**, Braverman LE, Martino E, Pinchera A. Role for inner ring deiodination preventing transcutaneous passage of thyroxine. *J Clin Endocrinol Metab* 2003;88(6):2825-2830. PMID 12788895

9. **Safer JD**, Crawford TM, Holick MF. A role for thyroid hormone in wound healing through keratin gene expression. *Endocrinology* 2004;145(5):2357-2361. PMID 14736740

10. **Safer JD**, Crawford TM, Holick MF. Topical thyroid hormone accelerates wound healing in mice. *Endocrinology* 2005;146(10):4425-4430. PMID 15976059

11. Saha AK, Persons K, **Safer JD**, Luo Z, Holick MF, Ruderman NB. AMPK regulation of the growth of cultured human keratinocytes. *Biochem Biophys Res Co* 2006;349(2):519-24. PMID 16949049

12. **Safer JD**, Ray S, Holick MF. A topical PTH/PTHrP receptor antagonist stimulates hair growth in mice. *Endocrinology* 2007;148(3):1167-1170. PMID 17170098

13. **Safer JD**, Persons K, Holick MF. A thyroid hormone deiodinase inhibitor can decrease cutaneous cell proliferation in vitro. *Thyroid* 2009;19(2):181-185. PMID 19191748

14. Ariza MA, Loken WM, Pearce EN, **Safer JD**. Male sex, African-American race/ethnicity, and T3 levels at diagnosis are predictors of weight gain following medication and radioactive iodine treatment for hyperthyroidism. *Endocr Pract* 2010;16(4):609-616. PMID 20350916

15. Abraham TM, de las Morenas A, Lee SL, **Safer JD**. In thyroid fine needle aspiration, use of bedside-prepared slides significantly increased diagnostic adequacy and specimen cellularity relative to solution-based samples. *Thyroid* 2011;21(3):237-242. PMID 21323589

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over 150,000 views, over 4200 comments

"Gender Revolution with Katie Couric" National Geographic Channel. Couric, Katie. February 6, 2017.
Extended interview with Katie Couric threaded into a 2-hour television special. Trailer:
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"Is gender identity biologically hard-wired?" Judd, Jackie. PBS NewsHour. May 13, 2015.
Extended interview for Jackie Judd http://www.pbs.org/newshour/bb/biology-gender-identity-children/
estimated just over 1,000,000 viewers per Nielsen

Innovation	**Significance/impact**
Development and leadership of the Transgender Medicine Clinical Center, Mount Sinai Health System and Icahn School of Medicine at Mount Sinai	• The Center for Transgender Medicine and Surgery at Mount Sinai is the first comprehensive center for transgender medical care in New York and the most comprehensive program in the United States • The Center is one of only several such centers in North America that are housed in academic teaching hospitals where care can be integrated • The Center is a model for such care delivery in North America.
Establishment, development, and leadership of the Transgender Medicine Clinical Center at Boston Medical Center	• The Center for Transgender Medicine and Surgery at BMC is the first comprehensive center for transgender medical care in New England • The Center is one of only several such centers in North America that are housed in academic teaching hospitals where care can be integrated • The Center is a model for such care delivery in North America.
Development and dissemination of the seminal reviews that are most widely cited in the lay press that explain the concept that gender identity is a biological phenomenon (see bibliography section above, e.g. PMID: 25667367).	• The concept that gender identity is a biological phenomenon has been a key component of the recent culture change in favor of mainstream medical care for transgender individuals (see media section above)
Development and dissemination of new and influential curricular content to teach the biology of gender identity in conventional medical education (see curriculum section above)	The teaching of evidence-based approaches to transgender medical care to: • Medical students (see bibliography section above, e.g. PMID 23425656 and PMID 27042742) • Physician trainees (see bibliography section above, e.g. PMID 26151424) • Practicing physicians (see invited lectures section above) serves as a crucial component to the gained credence given to care for transgender individuals in conventional medical settings.
Development and dissemination of seminal reviews supporting the safety of transgender hormone treatment regimens (see invited lectures section above)	• Once mainstream medical providers learn of the biology underlying gender identity, their biggest concern is the relative safety of the medical interventions relative to the benefit. • The development and dissemination of the seminal reviews and lectures supporting the safety of current treatment regimens serves as a further crucial component to the culture change among conventional medical providers in favor of routine medical care for transgender individuals